6.9.4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

RECEIVED
APR 16 1999
Environmental Cleanup Office

IN REPLY
REFER TO: OEA-095

April 15, 1999

MEMORANDUM

SUBJECT: Bunker Hill, CLP Metals Analysis, Data Validation
Case: 26852
SDG: MJAF44

147873
USEPA SF
1125006

FROM: Laura Castrilli, Chemist
Quality Assurance and Data Unit, OEA

TO: Mary Kay Voytilla, Regional Project Manager
Office of Environmental Cleanup

CC: Bruce Woods, Region 10 CLP TPO
Jim Stefanoff, CH2M Hill

The following is a validation of ICP-AES and mercury analyses of ten total and ten dissolved water samples from the Bunker Hill project. The analyses were performed following the USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Multi-media, Multi-Concentration, ILM04.0. Analyses were conducted by Sentinel, Inc, of Huntsville, Alabama. This validation was conducted for the following samples:

MJAF44	MJAF47	MJAF50	MJAF53	MJAF56	MJAF59	MJAF62
MJAF45	MJAF48	MJAF51	MJAF54	MJAF57	MJAF60	MJAF63
MJAF46	MJAF49	MJAF52	MJAF55	MJAF58	MJAF61	

Data Qualifications

The following comments refer to the Sentinel Laboratory's performance in meeting quality control specifications outlined in the *CLP Statement of Work (CLP-SOW) for Inorganic Analysis, rev. ILM04.0.* The comments presented herein are based on the information provided for the review.

1.0 Timeliness - Acceptable

The technical (40 CFR part 136) holding time from the date of collection for mercury in water is 28 days. The holding time for the remaining metals in water is 180 days. The samples were collected on 02/26/99. Mercury analyses were completed on 03/04/99. ICP-AES analyses were completed on 03/09/99.

2.0 Sample Preparation - Acceptable

The samples were prepared for mercury and ICP-AES analyses on 03/03/99.

3.0 Calibrations/Calibration Verifications - Acceptable

The samples were analyzed for mercury by CVAAS on 03/04/99. Initial calibration included one blank and six standards. The curve was linear with a correlation coefficient greater than 0.995.

The samples were analyzed by ICP-AES on 03/03/99 (main analyses), 03/08/99 (iron, manganese and/or zinc ten fold and hundred fold dilutions), and 03/09/99 (zinc ten fold, hundred fold and thousand fold dilutions). The instrument was standardized according to the analytical method each day of analysis using one blank and a single calibration standard for each element.

All ICP-AES and CVAAS (mercury) calibrations were performed as required and met the acceptance criteria; therefore, no qualification was made on this basis.

Continuing calibration verifications (CCVs) are required before and after sample analysis and after every 10 samples during analysis. Mercury recoveries must be within 80-120%. Other metal recoveries must be within 90-110%. The frequency of analysis of CCVs was met. All ICP-AES and CVAAS (mercury) CCVs (initial and continuing) bracketing reported sample results met the recovery criteria; therefore, no qualification was made on this basis.

4.0 Laboratory Control Samples -

Laboratory Control samples are digested and analyzed along with the samples to verify the efficiency of laboratory procedures. All recoveries associated with reported sample results met the acceptance criteria (80-120%R) for control samples; with the exception of silver (75%R). All silver results were qualified 'J', estimated based on the LCS result.

5.0 Blanks -

Procedural blanks were prepared with the samples to show potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified if the analyte concentration was less than five times the analytical value in the blank.

Aluminum, calcium, copper, iron, magnesium, potassium, and zinc were detected in the preparation blank. Aluminum, antimony, calcium, copper, iron, magnesium, manganese, and zinc were detected in one or more ICP-AES continuing calibration blanks (CCBs). Potassium, cadmium, and silver had negative values with absolute values greater

than the respective detection limits in one or more CCB. Based on blank contamination, associated sample results were qualified as follows:

- aluminum in samples MJAF48, MJAF50, and MJAF60 was qualified 'U'
- copper in samples MJAF57 and MJAF60 was qualified 'U'
- silver in samples MJAF50, MJAF55, and MJAF60 was qualified 'J' or 'UJ'

All other sample results were greater than five times the associated blank levels (or were already undetected) and were not qualified based on blank contamination.

6.0 ICP-AES Interference Check Sample -

The interference check sample (ICS) is analyzed by ICP-AES to verify interelement and background correction factors. Analysis is required at the beginning and end of each sample analysis run and recoveries must be between 80% and 120%. All ICS recoveries associated with reported sample results were within the recovery criterion; with the exception of copper in all three ICS-A samples (average of 69%R, true value of 28 ug/L) and zinc in two of the three ICS-A samples for the analysis on 03/03/99 (318% and 197%, true value of 33 ug/L). ICS-AB copper and zinc recoveries were within the 80-120% criteria (true value of 507 ug/L for copper, 1008 ug/L for zinc). Zinc results reported from the 03/03/99 analyses were not qualified on the basis of ICS-A recovery as those samples that had interferent levels of metals had zinc results nearer the ICS-AB levels.

The raw data for a number of samples had interfering levels of iron. Analytes for which iron is an interferent were qualified as follows:

- Antimony in samples MJAF44, MJAF46, MJAF52, MJAF56, and MJAF62 was qualified 'UJ', estimated detection limit (possible false positives due to high iron). Antimony in samples MJAF45 and MJAF55 was qualified 'J', estimated due to high iron. Antimony in the three ICS-A analyses bracketing these samples had results greater than the detection limit.

- Copper in samples MJAF48 and MJAF58 was qualified 'J' or 'UJ' as the copper was either undetected or near the ICS-A level in these samples with iron interference. The remaining samples with iron interference had copper levels at least a factor of 2 above the ICS-A level or had copper results near/above the ICS-AB level and were not qualified based on iron interference.

- Cadmium in samples MJAF48 and MJAF58 was qualified 'J', estimated as cadmium in the three ICS-A analyses bracketing these samples had results greater than the detection limit.

Some of the samples required one or more dilution runs to report zinc, iron, and manganese results within the instrumental linear range. The

raw data for all analytes were compared using the available dilutions to see if 1) zinc, iron, and/or manganese levels in the undiluted samples were high enough that interelement corrections may not be sufficient for the analytes that were reported from the undiluted analyses or 2) a pattern of suppression or enhancement was evident.

From this comparative study, the following results were qualified due to suspected interference (analytes already qualified due interference or due to poor serial dilution results were not qualified again, see section 11 for qualification due to serial dilution):

- Antimony was qualified 'UJ', estimated detection limit (possible false negative) in sample MJAF49.
- Arsenic, beryllium, nickel, selenium, and sodium were qualified 'J', estimated (unknown bias for sodium*; pattern of suppression/possible low bias for other analytes) in samples MJAF45 and MJAF55. * The bias for sodium is unknown as at first the sodium increased in the 10 fold dilution and then the sodium inexplicably disappeared (was undetected) in the 100 fold dilution.
- Arsenic, beryllium, nickel, and sodium were qualified 'J', estimated (pattern of enhancement/possible high bias for sodium; pattern of suppression/possible low bias for other analytes) in sample MJAF46.
- Nickel and sodium were qualified 'J', estimated (pattern of enhancement/possible high bias for sodium; pattern of suppression/possible low bias for nickel) in sample MJAF56.
- Sodium was qualified 'J', estimated (pattern of enhancement/possible high bias) in samples MJAF44, MJAF52, MJAF54, and MJAF62.

7.0 Duplicate Analysis - Acceptable

Duplicate analyses were done on sample MJAF49. Water duplicate results were within the ±20% Relative Percent Difference (RPD) or ±CRDL criteria for water results < 5 times the CRDL criteria.

8.0 Field Duplicate Analysis - Not Applicable

Field duplicate analysis for samples in this SDG was not indicated in the field collection documentation.

9.0 Matrix Spike Analysis -

Matrix spike sample analyses are done to provide information about the effect of the sample matrix on digestion and measurement methods. Matrix spike recovery must be within the limits of 75 - 125%.

Matrix spike analyses were done on sample MJAF65. All matrix spike recoveries were within the required QC limits, with the exception of antimony (70% recovery). All antimony results were qualified 'J', estimated (possible low bias).

10.0 Graphite Furnace Atomic Absorption Spec (GFAAS) QC - Not Applicable -

GFAAS was not used for the analysis of these samples.

11.0 ICP-AES Serial Dilution -

Sample MJAF49 was analyzed by ICP-AES serial dilution to check for potential interferences. All analytes which exceeded the minimum concentration criterion (50 times the IDL) agreed within the 10%D criteria; with the exception of aluminum (15%), cadmium (15%), calcium (15%), cobalt (15%), copper (525), iron (13%), lead (17%), magnesium (18%), manganese (13%), potassium (22%), silver (29%), and zinc (17%). The serial dilution for over half of the ICP analytes is outside the acceptance criteria.

It is suspected that there may be a procedural problem with the serial dilution analysis. All of the raw data for the samples that required dilution for reporting iron, manganese, and/or zinc were closely examined to see if there was agreement between the native and ten fold dilution analyses. Based on the reviewer's professional judgement, if the ten fold dilution agreed within 10%D with the native analysis (in some cases the ten fold dilution was compared to the hundred fold dilution as the native result was greater than the linear range), the analyte with the 'poor' serial dilution (five fold dilution) result was not qualified. Analytes with poor serial dilution results and no or poor ten fold dilution results were qualified 'J', estimated.

The following analytes were not qualified based on serial dilution results (laboratory 'E' qualifiers were removed by the reviewer):

- Aluminum in samples MJAF51, MJAF52, MJAF54, and MJAF62.
- Calcium in samples MJAF44, MJAF48, MJAF49, MJAF51, MJAF53, MJAF54, MJAF58, MJAF59, MJAF61, and MJAF63.
- Cadmium in samples MJAF44, MJAF49, MJAF51, MJAF53, MJAF54, MJAF59, MJAF61, and MJAF63.
- Cobalt in samples MJAF44, MJAF48, MJAF49, MJAF51, MJAF53, MJAF54, MJAF58, MJAF59, and MJAF63.
- Copper in samples MJAF52, MJAF54, MJAF62 and MJAF63.
- Iron in samples MJAF44, MJAF46, MJAF48, MJAF49, MJAF51, MJAF52, MJAF53, MJAF54, MJAF56, MJAF58, MJAF59, MJAF61, MJAF62, and MJAF63.
- Lead in samples MJAF44, MJAF48, MJAF49, MJAF51, MJAF53, MJAF54, MJAF58, MJAF59, MJAF61, and MJAF63.
- Magnesium in samples MJAF44, MJAF48, MJAF49, MJAF51, MJAF53, MJAF54, MJAF58, MJAF59, MJAF61, and MJAF63.
- Manganese in sample MJAF52.
- Potassium in samples MJAF46, MJAF49, MJAF52, MJAF53, MJAF54, MJAF56, MJAF59, MJAF61, MJAF62, and MJAF63.
- Silver in sample MJAF44.

12.0 Detection Limits - Acceptable

Sample results which fall below the instrument detection limit (IDL) are assigned the value of the instrument detection limit and the 'U' qualifier is attached. Contract Required Detection Limit (CRDL) standards are required to demonstrate a linear calibration curve near the CRDL. CRDL standards were run at the required frequency.

13.0 Overall Assessment of the Data

This validation of the data is based on the criteria outlined in the *National Functional Guidelines for Inorganic Data Review (02/94)*. Approximately 45.9% of the data was qualified based on blank contamination, interference, matrix spike recovery, lab control sample recovery, or poor serial dilution results. The data as qualified is acceptable for all purposes.

Below are the definitions for the National Functional Guidelines for Inorganic Data Review (02/94) qualifiers used when validating/qualifying data from Inorganic analysis.

DATA QUALIFIERS

U - The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

J - The associated value is an estimated quantity.

R - The data are unusable. (Note: Analyte may or may not be present.)

UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF44

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18377S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7890		~~E~~ J	P
7440-36-0	Antimony	4.8	~~B~~	U ~~N~~ J	P
7440-38-2	Arsenic	227			P
7440-39-3	Barium	11.6	B		P
7440-41-7	Beryllium	3.1	B		P
7440-43-9	Cadmium	559		~~E~~	P
7440-70-2	Calcium	35800		~~E~~	P
7440-47-3	Chromium	4.2	B		P
7440-48-4	Cobalt	152		~~E~~	P
7440-50-8	Copper	404		~~E~~ J	P
7439-89-6	Iron	288000		~~E~~	P
7439-92-1	Lead	372		~~E~~	P
7439-95-4	Magnesium	71400		~~E~~	P
7439-96-5	Manganese	66200		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	137			P
7440-09-7	Potassium	1060	B	~~E~~ J	P
7782-49-2	Selenium	18.7			P
7440-22-4	Silver	24.5		~~E~~	P
7440-23-5	Sodium	8180		J	P
7440-28-0	Thallium	9.6	B		P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	265000		~~E~~ J	P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF45

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18378S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	167000		E J	P
7440-36-0	Antimony	161		N J	P
7440-38-2	Arsenic	5590		J	P
7440-39-3	Barium	13.5	B		P
7440-41-7	Beryllium	32.7		J	P
7440-43-9	Cadmium	8090		E J	P
7440-70-2	Calcium	134000		E J	P
7440-47-3	Chromium	27.5			P
7440-48-4	Cobalt	2290		E J	P
7440-50-8	Copper	8050		E J	P
7439-89-6	Iron	13300000		E J	P
7439-92-1	Lead	99.9		E J	P
7439-95-4	Magnesium	360000		E J	P
7439-96-5	Manganese	30000		E J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1930		J	P
7440-09-7	Potassium	121	B	E J	P
7782-49-2	Selenium	3.1	U	J	P
7440-22-4	Silver	0.70	U	E J	P
7440-23-5	Sodium	383000		J	P
7440-28-0	Thallium	71.4			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	1740000		E J	P
	Cyanide				NR

4/12 04/14 pg

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF46

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18379S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	66200		~~E~~ J	P
7440-36-0	Antimony	63.6		U ~~N~~ J	P
7440-38-2	Arsenic	1900		J	P
7440-39-3	Barium	9.8	B		P
7440-41-7	Beryllium	15.3		J	P
7440-43-9	Cadmium	3740		~~E~~ J	P
7440-70-2	Calcium	75500		~~E~~ J	P
7440-47-3	Chromium	14.7			P
7440-48-4	Cobalt	887		~~E~~ J	P
7440-50-8	Copper	4350		~~E~~ J	P
7439-89-6	Iron	3010000		~~E~~	P
7439-92-1	Lead	587		~~E~~ J	P
7439-95-4	Magnesium	209000		~~E~~ J	P
7439-96-5	Manganese	358000		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	712		J	P
7440-09-7	Potassium	770	B	~~E~~	P
7782-49-2	Selenium	72.2			P
7440-22-4	Silver	77.1		~~E~~ J	P
7440-23-5	Sodium	126000		J	P
7440-28-0	Thallium	78.6			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	2340000		~~E~~ J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

6

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF47

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18380S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	764		E J	P
7440-36-0	Antimony	3.5	U	N J	P
7440-38-2	Arsenic	32.4			P
7440-39-3	Barium	5.4	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	7.9		E J	P
7440-70-2	Calcium	3890	B	E J	P
7440-47-3	Chromium	0.70	U		P
7440-48-4	Cobalt	9.6	B	E J	P
7440-50-8	Copper	35.9		E J	P
7439-89-6	Iron	19000		E J	P
7439-92-1	Lead	29.2		E J	P
7439-95-4	Magnesium	1870	B	E J	P
7439-96-5	Manganese	2170		E J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	6.9	B		P
7440-09-7	Potassium	744	B	E J	P
7782-49-2	Selenium	3.1	U		P
7440-22-4	Silver	0.74	B	E J	P
7440-23-5	Sodium	655	B		P
7440-28-0	Thallium	4.9	U		P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	3440		E J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF48

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18381S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	90.3	B	~~E~~ UJ	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	3.7	U		P
7440-39-3	Barium	21.5	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	16.7		~~E~~ J	P
7440-70-2	Calcium	396000		~~E~~	P
7440-47-3	Chromium	10.5			P
7440-48-4	Cobalt	292		~~E~~	P
7440-50-8	Copper	45.8		~~E~~ J	P
7439-89-6	Iron	144000		~~E~~	P
7439-92-1	Lead	686		~~E~~	P
7439-95-4	Magnesium	457000		~~E~~	P
7439-96-5	Manganese	347000		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	262			P
7440-09-7	Potassium	20000		~~E~~ J	P
7782-49-2	Selenium	75.4			P
7440-22-4	Silver	107		~~E~~ J	P
7440-23-5	Sodium	4840	B		P
7440-28-0	Thallium	121			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	36300		~~E~~ J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF49

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18382S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2200		E J	P
7440-36-0	Antimony	3.5	U	N J	P
7440-38-2	Arsenic	50.6			P
7440-39-3	Barium	31.0	B		P
7440-41-7	Beryllium	0.60	B		P
7440-43-9	Cadmium	150		E	P
7440-70-2	Calcium	193000		E	P
7440-47-3	Chromium	7.2	B		P
7440-48-4	Cobalt	170		E	P
7440-50-8	Copper	124		E J	P
7439-89-6	Iron	127000		E	P
7439-92-1	Lead	506		E	P
7439-95-4	Magnesium	230000		E	P
7439-96-5	Manganese	186000		E J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	155			P
7440-09-7	Potassium	9100		E	P
7782-49-2	Selenium	30.9			P
7440-22-4	Silver	51.8		E J	P
7440-23-5	Sodium	3110	B		P
7440-28-0	Thallium	46.2			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	91600		E J	P
	Cyanide				NR

4/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

8

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF50

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18383S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	159	B	~~E~~ UJ	P
7440-36-0	Antimony	3.5	U	~~N~~ UJ	P
7440-38-2	Arsenic	3.7	U		P
7440-39-3	Barium	102	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	21.0		~~E~~ J	P
7440-70-2	Calcium	21200		~~E~~ J	P
7440-47-3	Chromium	1.3	B		P
7440-48-4	Cobalt	20.0	B	~~E~~ J	P
7440-50-8	Copper	33.6		~~E~~ J	P
7439-89-6	Iron	4240		~~E~~ J	P
7439-92-1	Lead	843		~~E~~ J	P
7439-95-4	Magnesium	48400		~~E~~ J	P
7439-96-5	Manganese	15200		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	24.2	B		P
7440-09-7	Potassium	1300	B	~~E~~ J	P
7782-49-2	Selenium	3.1	U		P
7440-22-4	Silver	4.1	B	~~E~~ J	P
7440-23-5	Sodium	1260	B		P
7440-28-0	Thallium	4.9	U		P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	4120		~~E~~ J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

9

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF51

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18384S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1740		~~E~~	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	25.0			P
7440-39-3	Barium	18.0	B		P
7440-41-7	Beryllium	0.97	B		P
7440-43-9	Cadmium	193		~~E~~	P
7440-70-2	Calcium	16700		~~E~~	P
7440-47-3	Chromium	2.8	B		P
7440-48-4	Cobalt	27.4	B	~~E~~	P
7440-50-8	Copper	73.9		~~E~~ J	P
7439-89-6	Iron	81000		~~E~~	P
7439-92-1	Lead	611		~~E~~	P
7439-95-4	Magnesium	31000		~~E~~	P
7439-96-5	Manganese	26100		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	32.2	B		P
7440-09-7	Potassium	843	B	~~E~~ J	P
7782-49-2	Selenium	4.7	B		P
7440-22-4	Silver	9.6	B	~~E~~ J	P
7440-23-5	Sodium	1170	B		P
7440-28-0	Thallium	4.9	U		P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	81100		~~E~~ J	P
_____	Cyanide				NR

3/24/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF52

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18385S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	35400		~~E~~	P
7440-36-0	Antimony	22.9	~~B~~	~~N~~ J	P
7440-38-2	Arsenic	1660			P
7440-39-3	Barium	4.4	B		P
7440-41-7	Beryllium	6.7			P
7440-43-9	Cadmium	2260		~~E~~ J	P
7440-70-2	Calcium	101000		~~E~~ J	P
7440-47-3	Chromium	5.8	B		P
7440-48-4	Cobalt	824		~~E~~ J	P
7440-50-8	Copper	2390		~~E~~	P
7439-89-6	Iron	929000		~~E~~	P
7439-92-1	Lead	529		~~E~~ J	P
7439-95-4	Magnesium	123000		~~E~~ J	P
7439-96-5	Manganese	136000		~~E~~	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	687			P
7440-09-7	Potassium	795	B	~~E~~	P
7782-49-2	Selenium	36.7			P
7440-22-4	Silver	45.2		~~E~~ J	P
7440-23-5	Sodium	49100		J	P
7440-28-0	Thallium	19.5			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	1010000		~~E~~ J	P
_____	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF53

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18386S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2240		~~E~~ J	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	55.5			P
7440-39-3	Barium	31.5	B		P
7440-41-7	Beryllium	0.59	B		P
7440-43-9	Cadmium	155		~~E~~	P
7440-70-2	Calcium	197000		~~E~~	P
7440-47-3	Chromium	7.2	B		P
7440-48-4	Cobalt	177		~~E~~	P
7440-50-8	Copper	121		~~E~~ J	P
7439-89-6	Iron	130000		~~E~~	P
7439-92-1	Lead	524		~~E~~	P
7439-95-4	Magnesium	238000		~~E~~	P
7439-96-5	Manganese	186000		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	161			P
7440-09-7	Potassium	9450		~~E~~	P
7782-49-2	Selenium	29.8			P
7440-22-4	Silver	53.0		~~E~~ J	P
7440-23-5	Sodium	3430	B		P
7440-28-0	Thallium	46.6			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	92200		~~E~~ J	P
	Cyanide				NR

4/6 04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

18

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF54

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18387S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7980		~~E~~	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	167			P
7440-39-3	Barium	19.7	B		P
7440-41-7	Beryllium	3.0	B		P
7440-43-9	Cadmium	542		~~E~~	P
7440-70-2	Calcium	35400		~~E~~	P
7440-47-3	Chromium	3.5	B		P
7440-48-4	Cobalt	147		~~E~~	P
7440-50-8	Copper	409		~~E~~	P
7439-89-6	Iron	271000		~~E~~	P
7439-92-1	Lead	358		~~E~~	P
7439-95-4	Magnesium	70800		~~E~~	P
7439-96-5	Manganese	66700		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	133			P
7440-09-7	Potassium	1130	B	~~E~~	P
7782-49-2	Selenium	14.3			P
7440-22-4	Silver	22.6		~~E~~ J	P
7440-23-5	Sodium	7170		J	P
7440-28-0	Thallium	8.4	B		P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	273000		~~E~~ J	P
	Cyanide				NR

04/14 kg

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF55

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18388S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	171000		~~E~~ J	P
7440-36-0	Antimony	159		~~N~~ J	P
7440-38-2	Arsenic	5640		J	P
7440-39-3	Barium	17.8	B		P
7440-41-7	Beryllium	32.7		J	P
7440-43-9	Cadmium	8080		~~E~~ J	P
7440-70-2	Calcium	136000		~~E~~ J	P
7440-47-3	Chromium	26.6			P
7440-48-4	Cobalt	2280		~~E~~ J	P
7440-50-8	Copper	8320		~~E~~ J	P
7439-89-6	Iron	13400000		~~E~~ J	P
7439-92-1	Lead	108		~~E~~ J	P
7439-95-4	Magnesium	362000		~~E~~ J	P
7439-96-5	Manganese	29500		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1920		J	P
7440-09-7	Potassium	142	B	~~E~~ J	P
7782-49-2	Selenium	3.1	U	J	P
7440-22-4	Silver	0.70	U	~~E~~ J	P
7440-23-5	Sodium	372000		J	P
7440-28-0	Thallium	64.6			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	1760000		~~E~~ J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF56

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18389S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	63000		~~E~~ J	P
7440-36-0	Antimony	56.2	~~B~~	U ~~N~~ J	P
7440-38-2	Arsenic	1790			P
7440-39-3	Barium	14.7	B		P
7440-41-7	Beryllium	14.3			P
7440-43-9	Cadmium	3520		~~E~~ J	P
7440-70-2	Calcium	71500		~~E~~ J	P
7440-47-3	Chromium	13.3			P
7440-48-4	Cobalt	832		~~E~~ J	P
7440-50-8	Copper	4110		~~E~~ J	P
7439-89-6	Iron	2700000		~~E~~	P
7439-92-1	Lead	557		~~E~~ J	P
7439-95-4	Magnesium	198000		~~E~~ J	P
7439-96-5	Manganese	326000		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	668		J	P
7440-09-7	Potassium	802	B	~~E~~	P
7782-49-2	Selenium	72.7			P
7440-22-4	Silver	70.2		~~E~~ J	P
7440-23-5	Sodium	114000		J	P
7440-28-0	Thallium	82.8			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	2100000		~~E~~ J	P
	Cyanide				NR

4/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF57

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18390S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	655		~~E~~ J	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	10.8			P
7440-39-3	Barium	15.2	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.1	B	~~E~~ J	P
7440-70-2	Calcium	3770	B	~~E~~ J	P
7440-47-3	Chromium	1.1	B		P
7440-48-4	Cobalt	8.3	B	~~E~~ J	P
7440-50-8	Copper	29.7		~~E~~ UJ	P
7439-89-6	Iron	13900		~~E~~ J	P
7439-92-1	Lead	26.1		~~E~~ J	P
7439-95-4	Magnesium	1580	B	~~E~~ J	P
7439-96-5	Manganese	1750		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	6.1	B		P
7440-09-7	Potassium	797	B	~~E~~ J	P
7782-49-2	Selenium	3.1	U		P
7440-22-4	Silver	0.70	U	~~E~~ J	P
7440-23-5	Sodium	758	B		P
7440-28-0	Thallium	4.9	U		P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	524		~~E~~ J	P
	Cyanide				NR

~~E~~ 04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF58

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18391S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12.8	U	~~E~~ J	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	3.7	U		P
7440-39-3	Barium	23.7	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	16.0		~~E~~ J	P
7440-70-2	Calcium	403000		~~E~~	P
7440-47-3	Chromium	10.6			P
7440-48-4	Cobalt	297		~~E~~	P
7440-50-8	Copper	0.80	U	~~E~~ J	P
7439-89-6	Iron	147000		~~E~~	P
7439-92-1	Lead	587		~~E~~	P
7439-95-4	Magnesium	469000		~~E~~	P
7439-96-5	Manganese	351000		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	268			P
7440-09-7	Potassium	20900		~~E~~ J	P
7782-49-2	Selenium	77.8			P
7440-22-4	Silver	110		~~E~~ J	P
7440-23-5	Sodium	5020			P
7440-28-0	Thallium	128			P
7440-62-2	Vanadium	1.4	U	J	P
7440-66-6	Zinc	36400		~~E~~ J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF59

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18392S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2240		~~E~~ J	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	3.7	U		P
7440-39-3	Barium	38.1	B		P
7440-41-7	Beryllium	0.70	B		P
7440-43-9	Cadmium	157		~~E~~	P
7440-70-2	Calcium	200000		~~E~~	P
7440-47-3	Chromium	7.1	B		P
7440-48-4	Cobalt	179		~~E~~	P
7440-50-8	Copper	136		~~E~~ J	P
7439-89-6	Iron	83800		~~E~~	P
7439-92-1	Lead	493		~~E~~	P
7439-95-4	Magnesium	241000		~~E~~	P
7439-96-5	Manganese	191000		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	164			P
7440-09-7	Potassium	9560		~~E~~	P
7782-49-2	Selenium	32.2			P
7440-22-4	Silver	53.4		~~E~~ J	P
7440-23-5	Sodium	3710	B		P
7440-28-0	Thallium	42.4			P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	94500		~~E~~ J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF60

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18393S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.3	B	~~E~~ UJ	P
7440-36-0	Antimony	3.5	U	~~N~~ J	P
7440-38-2	Arsenic	3.7	U		P
7440-39-3	Barium	106	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	20.8		~~E~~ J	P
7440-70-2	Calcium	21300		~~E~~ J	P
7440-47-3	Chromium	0.78	B		P
7440-48-4	Cobalt	19.5	B	~~E~~ J	P
7440-50-8	Copper	28.1		~~E~~ UJ	P
7439-89-6	Iron	2180		~~E~~ J	P
7439-92-1	Lead	182		~~E~~ J	P
7439-95-4	Magnesium	48900		~~E~~ J	P
7439-96-5	Manganese	15200		~~E~~ J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	24.6	B		P
7440-09-7	Potassium	1280	B	~~E~~ J	P
7782-49-2	Selenium	3.1	U		P
7440-22-4	Silver	2.3	B	~~E~~ J	P
7440-23-5	Sodium	1220	B		P
7440-28-0	Thallium	4.9	U		P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	4050		~~E~~ J	P
	Cyanide				NR

dlc 4/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF61

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18394S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1730		E J	P
7440-36-0	Antimony	3.5	U	N J	P
7440-38-2	Arsenic	18.7			P
7440-39-3	Barium	22.0	B		P
7440-41-7	Beryllium	1.0	B		P
7440-43-9	Cadmium	193		E	P
7440-70-2	Calcium	16700		E	P
7440-47-3	Chromium	3.3	B		P
7440-48-4	Cobalt	28.4	B	E J	P
7440-50-8	Copper	74.1		E J	P
7439-89-6	Iron	78700		E	P
7439-92-1	Lead	612		E	P
7439-95-4	Magnesium	31200		E	P
7439-96-5	Manganese	26200		E J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	32.3	B		P
7440-09-7	Potassium	857	B	E	P
7782-49-2	Selenium	6.5			P
7440-22-4	Silver	9.9	B	E J	P
7440-23-5	Sodium	1410	B		P
7440-28-0	Thallium	4.9	U		P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	80700		E J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJAF62

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18395S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	35700		~~E~~	P
7440-36-0	Antimony	23.5	~~B~~ U	~~N~~ J	P
7440-38-2	Arsenic	1680			P
7440-39-3	Barium	10.6	B		P
7440-41-7	Beryllium	7.0			P
7440-43-9	Cadmium	2310		~~E~~ J	P
7440-70-2	Calcium	103000		~~E~~ J	P
7440-47-3	Chromium	6.7	B		P
7440-48-4	Cobalt	844		~~E~~ J	P
7440-50-8	Copper	2430		~~E~~	P
7439-89-6	Iron	960000		~~E~~	P
7439-92-1	Lead	539		~~E~~ J	P
7439-95-4	Magnesium	126000		E J	P
7439-96-5	Manganese	139000		E J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	703			P
7440-09-7	Potassium	842	B	~~E~~	P
7782-49-2	Selenium	39.1			P
7440-22-4	Silver	49.5		~~E~~ J	P
7440-23-5	Sodium	53100		J	P
7440-28-0	Thallium	20.1			P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	1000000		E J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

21

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJAF63

Lab Name: SENTINEL, INC. Contract: 68-D5-0167

Lab Code: SENTIN Case No.: 26852 SAS No.: SDG No.: MJAF44

Matrix (soil/water): WATER Lab Sample ID: 18396S

Level (low/med): LOW Date Received: 02/27/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2260		E J	P
7440-36-0	Antimony	3.5	U	N J	P
7440-38-2	Arsenic	3.7	U		P
7440-39-3	Barium	41.9	B		P
7440-41-7	Beryllium	0.66	B		P
7440-43-9	Cadmium	156		E	P
7440-70-2	Calcium	199000		E	P
7440-47-3	Chromium	7.5	B		P
7440-48-4	Cobalt	179		E	P
7440-50-8	Copper	210		E	P
7439-89-6	Iron	83600		E	P
7439-92-1	Lead	495		E	P
7439-95-4	Magnesium	240000		E	P
7439-96-5	Manganese	184000		E J	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	164			P
7440-09-7	Potassium	9390		E	P
7782-49-2	Selenium	31.1			P
7440-22-4	Silver	53.4		E J	P
7440-23-5	Sodium	3760	B		P
7440-28-0	Thallium	46.6			P
7440-62-2	Vanadium	1.4	U		P
7440-66-6	Zinc	92800		E J	P
	Cyanide				NR

04/14/99

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: